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First Integrated Pelagic Survey of the Northeast U.S. Shelf Completed

Researchers have completed the first comprehensive survey of the upper waters of the continental shelf off of the Northeast U.S. from Cape Hatteras, North Carolina to the Nova Scotia Shelf, including Georges Bank and the Gulf of Maine.

The focus was on the physics, chemistry, and biology of the water column - or pelagic zone, where most primary production occurs - rather than the ocean bottom. The scientific parties worked from the NOAA Ship *Pisces* and spent 16 days at sea to conduct the work.

Three federal agencies were involved in the survey: NOAA, NASA, and the Bureau of Ocean Energy Management (BOEM), each investigating a different aspect of the ocean. Scientists from the City University of New York (CUNY) Staten Island participated in the cruise as marine mammal and bird observers with BOEM support.

A wide variety of data were collected on plankton, fish, invertebrates, marine mammals, sea birds, and sea turtles encountered in the survey. Researchers also collected information on the ocean water, including nutrients, light levels, distribution of currents and other properties.

A secondary survey objective was to learn how to integrate various operations, which involved traditional and novel techniques and instruments. The 209-ft. *Pisces*, whose homeport is Pascagoula, Miss., is being jointly utilized by the NEFSC and the Southeast Fisheries Science Center (SEFSC), headquartered in Miami. NOAA's modern class of research vessels, which includes the *Henry B. Bigelow* and the *Pisces*, has greatly expanded scientists' capabilities to do this type of multidisciplinary work.

Data and samples collected on the survey will be distributed to regional universities and research institutions including the University of Connecticut, University of Maine, University of New Hampshire, and Woods Hole Oceanographic Institution.

The information collected will be used in fisheries stock assessments, ecosystem status reports, satellite development, and offshore energy planning. Once processed, the data also will be deposited in national archives and be publically available. Integrating the data across institutions and agencies remains a challenge, but the comprehensive collection is an important step in understanding the ecosystem as a whole and how the different components interact.

"The Northeast Integrated Pelagic Survey aboard the *Pisces* was different from past ecosystem-oriented cruises because of its wide scope of coverage," said Jerry Prezioso from the NEFSC's Narragansett Laboratory in Rhode Island, who served as chief scientist. "This was

the first time we've studied light levels, zooplankton, ichthyoplankton, fish, birds and mammals in one all-encompassing survey. These wide-ranging studies were made possible by the collaboration of groups from NOAA Fisheries, NASA, the University of Maine, the City University of New York, and Cornell University."

Prezioso kept a blog that detailed the science as well as day-to-day life during the 16-day survey (http://nefsc.wordpress.com/).

An oceanographer who spends a lot of time at sea, Prezioso said it is important to publicize these collaborative surveys because they represent a window into the northeast continental shelf ecosystem and are an opportunity for researchers to obtain data from a unique time series that is not being carried out by anyone else.

"My hope is that as these surveys become more widely known, researchers and students will be able to gain a better understanding of the changing conditions of the northeast shelf," Prezioso said. "Researchers may not be aware that these kinds of cruises exist and the wealth of data that is available."

Jon Hare, director of the NEFSC's Narragansett Laboratory and a survey participant, said that "one of the important outcomes was learning the value of working together to collect data that contributes to multiple scientific and management objectives. I hope this can be a model for inter-agency and inter-institutional collaboration and cooperation," said Hare, who also heads the NEFSC's Oceanography Branch.

"One of the many advantages of this survey was having a lot of expertise in one place," said Mike Jech, a fishery acoustics expert at the NEFSC's Woods Hole Laboratory who was also aboard the *Pisces*. "We basically combined our ecosystem monitoring survey and our herring acoustic survey, then augmented them to include a broader range of measurements of the pelagic ecosystem. Having so much data on various aspects of the pelagic ecosystem, collected at the same time and location, will make integrating the data much easier and much more valuable."

Weather conditions during the February survey were tough, as a series of winter storms with high winds moved through the Northeast, preventing some planned offshore sampling. Still, a lot was accomplished. "We had a ship with officers and crew capable of accommodating a number of different operations, and the sampling gear and scientific personnel on the ship to accomplish the tasks," Jech said, noting that a number of factors fell into place to make it work.

"All the acoustics data, collected by hull-mounted instruments, was processed in real-time while I was at sea," said Jech, who is already thinking about how the data can be used and shared, and ways to improve sampling efforts to further maximize future surveys.

Hare and Jech plan to conduct another integrated pelagic survey during 2013 or 2014.

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Related links:
NEFSC's Oceanography Branch: http://www.nefsc.noaa.gov/epd/ocean/
NEFSC Research Cruise Blog: http://nefsc.wordpress.com/
NOAA Marine Operations: http://www.moc.noaa.gov/